

Beths Grammar School KS4 Biology Curriculum Map – Year 10

Term	INTENT	IMPLEMENTATION	IMPACT
GCSE OCR Biology A Gateway Science Suite	<p>Substantive Knowledge This is the specific, factual content for the topic, which should be connected into a careful sequence of learning.</p>	<p>Disciplinary Knowledge (Skills) This is the action taken within a particular topic in order to gain substantive knowledge.</p>	<p>Assessment opportunities What assessments will be used to measure student progress? Evidence of how well students have learned the intended content.</p>
Autumn Term 1A Year 10	<p><u>Intent</u> Why is this taught now?</p> <p>B2.2 – The Challenges of Size From KS3 Science, learners should be familiar with the role of diffusion in the movement of materials in and between cells. They should also be familiar with the human gaseous exchange system. They will build on this knowledge and learn that when organisms become multicellular, the need arises for highly adapted structures including gaseous exchange surfaces and transport systems, enabling living processes to be performed effectively.</p>	<p>B2.2a – Explain the need for exchange surfaces and a transport system in multicellular organisms in terms of surface area : volume ratio. B2.2b – Describe some of the substances transported into and out of a range of organisms in terms of the requirements of those organisms. B2.2c – Describe the human circulatory system. B2.2d – Explain how the structure of the heart and the blood vessels are adapted to their functions. B2.2e – Explain how red blood cells and plasma are adapted to their transport functions in the blood. B2.2f – Explain how water and mineral ions are taken up by plants, relating the structure of the root hair cells to their function. B2.2g – Describe the processes of transpiration and translocation. B2.2h – Explain how the structure of the xylem and phloem are adapted to their functions in the plant. B2.2i – Explain the effect of a variety of environmental factors on the rate of water uptake by a plant. B2.2j – Describe how a simple potometer can be used to investigate factors that affect the rate of water uptake.</p>	<ul style="list-style-type: none"> • B2 end-of-unit test • Year 10 trial exam • Year 11 trial exam • PAGs B1, B6 and B8

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<p>Autumn Term 1B Year 10</p>	<p>Intent Why is this taught now?</p>	<p>B3.1a – Describe the structure of the nervous system. B3.1b – Explain how the components of the nervous system can produce a coordinated response. B3.1c – Explain how the structure of a reflex arc is related to its function. B3.1d – Explain how the main structures of the eye are related to their functions. B3.1e – Describe common defects of the eye and explain how some of these problems may be overcome. B3.1f – Describe the structure and function of the brain. B3.1g – Explain some of the difficulties of investigating brain function. B3.1h – Explain some of the limitations in treating damage and disease in the brain and other parts of the nervous system.</p>	<ul style="list-style-type: none"> • B3.1 end-of-unit test • Year 10 trial exam • Year 11 trial exam • PAGs B1 and B6
	<p>B3.1 – The Nervous System From KS3 Science, learners should have a concept of the hierarchical organism of multicellular organisms from cells to tissues to organs to systems to organisms. They will build on this knowledge and learn that the human nervous system is an important part of how the body communicates with itself and also receives information from its surroundings.</p>	<p>B3.2a – Describe the principles of hormonal coordination and control by the human endocrine system. B3.2b – Explain the roles of thyroxine and adrenaline in the body. B3.2c – Describe the role of hormones in human reproduction including the control of the menstrual cycle. B3.2d – Explain the interactions of FSH, LH, oestrogen and progesterone in the control of the menstrual cycle. B3.2e – Explain the use of hormones in contraception and evaluate hormonal and non-hormonal methods of contraception. B3.2f – Explain the use of hormones in modern reproductive technologies to treat infertility.</p>	<ul style="list-style-type: none"> • B3.2 end-of-unit test • Year 10 trial exam • Year 11 trial exam • PAGs B2 and B6
	<p>B3.2 – The Endocrine System From KS3 Science, learners should be aware of a number of hormones including adrenaline and the male and female sex hormones. They will build on this knowledge and learn that hormones are chemical messengers. In animals, hormones are transported around the body in the blood and affect target tissues and organs. Hormones have a variety of roles in the human body, including controlling reproduction. Plant hormones are chemicals that regulate plant growth and development. They can be used in agriculture to control the rate of growth.</p>		

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<p>Spring Term 2A Year 10</p>	<p>Intent Why is this taught now?</p>	<p>B3.2g – Explain how plant hormones are important in the control and coordination of plant growth and development, with reference to the role of auxins in phototropisms and gravitropisms.</p> <p>B3.2h – Describe some of the variety of effects of plant hormones, relating to auxins, gibberellins and ethene.</p> <p>B3.2i – Describe some of the different ways in which people use plant hormones to control plant growth.</p>	
	<p>B3.2 – The Endocrine System Continuing the work started in Autumn Term 1B.</p>		
	<p>B3.3 – Maintaining Internal Environments Learners will build on the knowledge and understanding gained in section 3.1 about coordination and control when considering the topics in this section. They will build on this knowledge and learn that homeostasis is crucial to the regulation of internal environments and enables organisms to adapt to change, both internally and externally. Internal temperature, blood sugar levels and osmotic balance are regulated by a number of organs and systems working together.</p>	<p>B3.3a – Explain the importance of maintaining a constant internal environment in response to internal and external change.</p> <p>B3.3b – Describe the function of the skin in the control of body temperature.</p> <p>B3.3c – Explain how insulin controls blood sugar levels in the body.</p> <p>B3.3d – Explain how glucagon interacts with insulin to control blood sugar levels in the body.</p> <p>B3.3e – Compare type 1 and type 2 diabetes and explain how they can be treated.</p>	<ul style="list-style-type: none"> • B3 end-of-unit test • Year 10 trial exam • Year 11 trial exam • PAGs B2, B6 and B8

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<p>Spring Term 2B Year 10</p>	<p>Intent Why is this taught now?</p>	<p>B3.3f – Explain the effect on cells of osmotic changes in body fluids. B3.3g – Describe the function of the kidneys in maintaining the water balance of the body. B3.3h – Describe the gross structure of the kidney and the structure of the kidney tubule. B3.3i – Describe the effect of ADH on the permeability of the kidney tubules. B3.3j – Explain the response of the body to different temperature and osmotic challenges.</p>	
	<p>B3.3 – Maintaining Internal Environments Continuing the work started in Spring Term 2A.</p>		
	<p>B4 – Ecosystems From KS3 Science, learners should be familiar with the idea of a food web and the interrelationships associated with them and that variation allows living things to survive in the same ecosystem. They should also recognise that organisms affect their environment and are affected by it. They will build on this knowledge and learn that microorganisms play an important role in the continuous cycling of chemicals in ecosystems. Biotic and abiotic factors interact in an ecosystem and have an effect on communities. Living organisms form populations of single species, communities of many species and are part of ecosystems. Living organisms are interdependent and show adaptations to their environment. Feeding relationships reflect the stability of an ecosystem and indicate the flow of biomass through the ecosystem.</p>	<p>B4.1e – Describe different levels of organisation in an ecosystem from individual organisms to the whole ecosystem. B4.1f – Explain how abiotic and biotic factors can affect communities. B4.1g – Describe the importance of interdependence and competition in a community. B4.1h – Describe the differences between the trophic levels of organisms within an ecosystem. B4.1i – Describe pyramids of biomass and explain, with examples, how biomass is lost between the different trophic levels. B4.1j – Calculate the efficiency of biomass transfers between trophic levels and explain how this affects the number of trophic levels in a food chain.</p>	<ul style="list-style-type: none"> • B4 end-of-unit test • Year 11 trial exam • PAGs B1, B3, B4 and B7

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Summer Term 3A Year 10	Intent Why is this taught now?	B4.1a – Recall that many different materials cycle through the abiotic and biotic components of an ecosystem.	
	B4 – Ecosystems Continuing the work started in Spring Term 2B.	B4.1b – Explain the role of microorganisms in the cycling of materials through an ecosystem. B4.1c – Explain the importance of the carbon cycle and the water cycle to living organisms. B4.1d – Explain the effect of factors such as temperature, water content, and oxygen availability on rate of decomposition	
	B5.1 – Inheritance From KS3 Science, learners should be familiar with the idea of heredity as the process by which genetic information is passed from one generation to the next. They should have a simple model of chromosomes, genes and DNA. They will build on this knowledge and learn that inheritance relies on the genetic information contained in the genome being passed from one generation to the next, whether sexually or asexually. The characteristics of a living organism are influenced by the genome and its interaction with the environment.	B5.1a – Explain the following terms: gamete, chromosome, gene, allele/variant, dominant, recessive, homozygous, heterozygous, genotype and phenotype. B5.1b – Describe the genome as the entire genetic material of an organism. B5.1c – Describe that the genome, and its interaction with the environment, influence the development of the phenotype of an organism. B5.1f – Explain some of the advantages and disadvantages of asexual and sexual reproduction in a range of organisms. B5.1l – Recall that most phenotypic features are the result of multiple genes rather than single gene inheritance.	<ul style="list-style-type: none"> • B5.1 end-of-unit test • Year 11 trial exam
Summer Term 3B Year 10	Intent Why is this taught now?	B5.1d – Recall that all variants arise from mutations, and that most have no effect on the phenotype, some influence phenotype and a very few determine phenotype.	
	B5.1 – Inheritance Continuing the work started in Summer Term 3A.	B5.1e – Describe how genetic variants may influence phenotype: in coding DNA by altering the activity of a protein; and in non-coding DNA by altering how genes are expressed. B5.1g – Explain the terms haploid and diploid. B5.1h – Explain the role of meiotic cell division in halving the chromosome number to form gametes. B5.1i – Explain single gene inheritance. B5.1j – Predict the results of single gene crosses. B5.1k – Describe sex determination in humans using a genetic cross. B5.1m – Describe the development of our understanding of genetics.	

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